N THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Attorney Docket No. 13784US02

In the Application of:

Uri Elzur

Serial No. 10/651,459

Filed: August 29, 2003

For: SYSTEM AND METHOD FOR HANDLING OUT-OF-ORDER FRAMES

Examiner: Brian D. Nguyen

Group Art Unit: 2616

Confirmation No. 8761

ELECTRONICALLY FILED ON 18-OCT-2006

REPLY BRIEF

MS: APPEAL BRIEF-PATENTS
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with 37 CFR 41.41, the Appellant submits this Reply Brief in response to the Examiner's Answer mailed on August 23, 2006 ("Examiner's Answer). Claims 1-29 are pending in the present Application. The Appellant has responded to the Examiner in the Examiner's Answer, as found in the following Argument section.

As may be verified in his final Office Action, dated March 20, 2006 ("Final Office Action"), Claims 1-12 and 14-29 were finally rejected and claim 13 was objected to. Pending claims 1-29 are the subject of this appeal.

The present application includes claims 1-29, which are pending in the present application. Claim 13 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. Claims 1, 4-12, and 14-22 stand rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent Application Publication 2002/0034182 ("Mallory"). Claims 2-3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mallory in view of United States Patent Application Publication 20030046330 ("Hayes"). Claims 23-29 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mallory in view of Hayes and admitted prior art (APA) (paragraph 09 of the background of the Application). The Applicant identifies claims 1-29 as the claims that are being appealed.

To aid the Board in identifying corresponding arguments, the Appellant has used the same headings in the Argument section of this Reply Brief as the headings found in the Appellant's corresponding Brief on Appeal. The Brief on Appeal has a date of deposit of June 29, 2006.

STATUS OF THE CLAIMS

Claims 1-29 were finally rejected. Pending claims 1-29 are the subject of this appeal.

ARGUMENT

The Final Office Action rejects claims 1, 4-12, and 14-22 under 35 U.S.C. 102(b) as being anticipated by Mallory. Claims 2-3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mallory in view of Hayes. Claims 23-29 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mallory in view of Hayes and the APA. Claim 13 was objected to as being dependent upon a rejected base claim.

I Rejection of Independent Claims 1 and 17 under 35 U.S.C. § 102(b)

The Examiner states the following in the Examiner's Answer:

> The reorder buffer is equivalent to the host memory because both the host memory claimed in claims 1 and 17 and the reorder buffer are used for storing out-of-order frame. In addition, buffer is defined as an area of memory used for storing messages.

See the Examiner's Answer at page 7. Initially, the Applicant points out that the present application clearly discloses a host and host memory (see for example Figure 1A and corresponding description) that handle processing of out-of-order frames, as claimed by the Applicant in claims 1 and 17. Mallory, on the other hand, does not disclose a host or a host memory that handle processing of out-of-order frames. The Applicant maintains that Mallory only discloses that out-of-order frames may be buffered in a receiver buffer, or a reorder buffer, and **not a host memory**. The Examiner is referred to Figure 4 of Mallory, for example, where it is clearly shown that the reorder buffer 120 is a separate temporary memory, or a buffer, within the LARQ handler 100, and is not a host memory. Furthermore, Mallory does not teach, nor suggest, that the receiver buffer 120 is a host memory or is located within a host memory. Mallory also does not

suggest or disclose that the LARQ handler 120 is a host or is located within a host.

The Applicant further disagrees with the Examiner's assessment in the Examiner's Answer that "the receive buffer is equivalent to the host memory." The Applicant maintains that the terms "receive buffer" and "host memory" have a specific meaning and use in the relevant arts and are clearly not equivalent. Again, the Applicant clearly discloses a host and associated host memory, and the Mallory reference does not disclose either, and therefore Applicant submits that all of the processing disclosed in Mallory necessarily is performed **outside of the host and associated host memory**.

Additionally, the Examiner further states the following in the Examiner's Answer:

> Paragraph 0060 teaches of managing information relating to one or more holes (gap) by stating that "where the next higher layer requires frames in order, or resumes the loss of frames if they are out of order, the LARQ handler should be configured to buffer frames following a gap for a time in a reorder buffer so that if the receiver can fill the gap with retransmitted frames in time, the frame can be passed to the next layer in sequence order."

See id. at pages 7-8. The Applicant again maintains that Mallory merely discloses that out-of-order frames may be stored in a buffer, but does not teach or suggest "placing data of the out-of-order frame in a host memory," that the buffer is in a host memory, or "managing information relating to one or more holes in a receive window," as claimed by the Applicant. With respect to ¶ [0060] of Mallory, the Applicant maintains that there is simply nothing in that paragraph that relates to a "receive window" in the context of the Applicant's present application, and certainly not "managing information relating to one or more holes in a receive window." That passage merely discloses a LARQ handler, but does

not teach or suggest a "receive window," or "managing information relating to one or more holes in a receive window."

With regard to ¶ [0140], the Examiner further states the following in the Examiner's Answer:

> Paragraph 0140 teaches of managing information relating to one or more holes in a receive window by stating that "if a received frame's sequence number (not a Nack control frame) is new and within a window of MaxRxSaveCountChannel from Receive Sequence Number, the receiver will update its state by advancing the window of recent sequence numbers until the received frame's sequence number is current. If the received frame's new sequence number was outside of the valid sequence numbers, the sequence number should have been treated as out-of-sequence, and the channel reset function performed so that the new frame will be in-sequence."

See id. at page 8. This portion of Mallory merely states that a frame's sequence number may be within a window of MaxRxSaveCountChannel and the receiver of Mallory may be adapted to update its state by manipulating the received frames' sequence numbers. While the "receiver will update its state by advancing the window of recent sequence numbers until the received frame's sequence number is current," the Applicant maintains that this portion of Mallory does not teach, nor suggest, "placing data of the out-of-order frame in a host memory," or "managing information relating to one or more holes in a receive window," as recited in claim 1, nor "determin[ing] a buffer location in a host memory in which to place the data information," or "managing receive window hole information," as recited in claim 17.

With regard to ¶ [0141], the Examiner further states the following in the Examiner's Answer:

> Paragraph 0141 teaches of managing information relating to one or more holes in a receive window by stating that "The Receive Sequence Number is repeatedly incremented by 1 (modulo 256, or

> other size of the sequence space) until it is equal to the received frame's sequence number. Each time it is updated, the state of the new current sequence number is initialized as missing and the time when it was first missed is recorded, unless the current number is that of the receive frame and the receive frame was a valid data frame (not a reminder and not errored). If the frame is marked received, it is also saved, possibly temporarily. For each new sequence number, the trailing edge of the sliding window of recent sequence numbers also changes."

See id. at page 8. The Applicant maintains that this portion of Mallory merely discloses that sequence numbers are repeatedly incremented, and that received frames are saved. Again, there is nothing in this portion of Mallory that teaches or suggests "placing data of the out-of-order frame in a host memory," "managing information relating to one or more holes in a receive window," as recited in claim 1, and "determin[ing] a buffer location in a host memory in which to place the data information," or "managing receive window hole information," as recited in claim 17. The Applicant maintains that a change in the sequence number of a sliding window is by no means "managing information relating to one or more holes in a receive window," or "managing receive window hole information."

Accordingly, the Applicant submits that claims 1 and 17 are allowable over the references cited in the Final Office Action.

II. Rejection of Dependent Claim 4 under 35 U.S.C. § 102(b)

Claim 4 depends on independent claim 1. Therefore, the Applicant maintains that claim 4 is allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1. Additionally, the Applicant maintains that Mallory does not disclose or suggest at least the limitation of "the network subsystem does not store one or more missing frames relating to the out-of-order frame," as claimed by the Applicants in claim 4.

With regard to claim 4, the Examiner states the following on page 8 of the Examiner's Answer:

> Regarding claim 4, the applicant argued that Mallory does not disclose not storing one or more missing frames relating to the out-of-order frame. The examiner disagrees because Mallory clearly discloses in figure 10, steps S5, S9, S10, that bad, duplicate, or too old frames are dropped, not stored as claimed in claim 4.

In order to overcome this deficiency, the Examiner's Answer refers to Figure 10 of Mallory. The Applicant points out that "bad, duplicate or too old frames" are clearly not equivalent to "missing frames" in the context of the present application. The Applicant, therefore, maintains that Mallory does not disclose or suggest any processing action (or lack thereof) with regard to one or more missing frames, as recited by the Applicant in claim 4. Accordingly, the Applicant submits that claim 4 is allowable over the references cited in the Final Office Action.

III. Rejection of Dependent Claim 5 under 35 U.S.C. § 102(b)

Claim 5 depends on independent claim 1. Therefore, the Applicant maintains that claim 5 is allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

IV. Rejection of Dependent Claim 6 under 35 U.S.C. § 102(b)

Claim 6 depends on independent claim 1. Therefore, the Applicant maintains that claim 6 is allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

With regard to claim 6, the Examiner states the following on page 9 of the Examiner's Answer:

> Regarding claim 6, the applicant argued that Mallory does not disclose placing the data of the out-of-order frame in the host memory if the out-of-order frame is determined to be inside the receive window. The examiner disagrees because Mallory teaches in paragraph 0058 that "if the current frame is not the oldest missing frame, it is stored in the receiver's reorder buffer." Note that determining if a frame is inside the receive window or not is based on the result of determining if the frame is too old as described in paragraph 0058. In this paragraph, too old (outside the window) frame is dropped and the not too old (inside the window) is stored in the receiver's reorder buffer.

The Applicant respectfully disagrees. The Examiner is referred again to Figure 10 and paragraph 0058 of Mallory, which disclose that if the sequence number is "too old", then the frame is dropped. In other words, the frames with sequence numbers that are "too old", which still qualify as out-of-order frames inside the received window, are dropped rather than being stored in host memory, as claimed by the Applicant.

The Applicant further submits that there is no support in Mallory for the Examiner's statements that "too old" refers to frames that are "outside the window", and "not too old" refers to frames that are "inside the window". Initially, the Applicant points out that Mallory does not disclose or suggest any processing of out-of-order frames with regard to a "receive window", as disclosed by the Applicant. Mallory, including paragraph 0058 of Mallory, also does not provide any clarification whatsoever, or a definition, of what a "too old" or a "not too old" frame is. In addition, Mallory discloses that not all out-of-order frames are being processed by the LARQ handler 100, as evidenced by the fact that the "too old" frames are being dropped without processing (see step S10 in Figure 10 of Mallory). Therefore, Mallory does not disclose or suggest placing the data of the out-of-order frame in the host memory if the out-of-order frame is determined to be inside the receive window, as claimed by the Applicant.

Furthermore, Mallory is exactly the type of prior art discussed by Applicant in its Background section, at paragraph 04 for example:

> For example, some conventional offload engines may merely drop out-of-order TCP segments. Dropped TCP segments need to be retransmitted by the sender, thereby utilizing additional bandwidth and reducing effective throughput.

In this regard, Mallory discloses how some out-of-order frames are dropped, which is what the present application is designed to avoid. The present application is, therefore, distinguished from Mallory at least for this reason.

Accordingly, the Applicant submits that claim 6 is allowable over the references cited in the Final Office Action.

V. Rejection of Dependent Claim 7 under 35 U.S.C. § 102(b)

Claim 7 depends on independent claim 1. Therefore, the Applicant maintains that claim 7 is allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

VI. Rejection of Dependent Claim 8 under 35 U.S.C. § 102(b)

Claim 8 depends on independent claim 1. Therefore, the Applicant maintains that claim 8 is allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

With regard to claim 8, the Examiner states the following on page 9 of the Examiner's Answer:

> Regarding claim 8, the applicant argued that Mallory does not discloses placing a portion of the data of the out-of-order frame in the host memory, the portion of that data being inside the receive window. The examiner disagrees because Mallory teaches in

> paragraph 0058 that "if the current frame is not the oldest missing frame, it is stored in the receiver's reorder buffer." Note that determining if a frame is inside the receive window or not is based on the result of determining if the frame is too old as described in paragraph 0058. In this paragraph, too old (outside the window) frame is dropped and the not too old (inside the window) is stored in the receiver's reorder buffer.

The Applicant maintains that Mallory does not disclose or suggest "placing a portion of the data of the out-of-order frame in the *host memory*, the portion of the data being inside the receive window," as recited by the Applicant in claim 8. In addition, as mentioned above, the Applicant further submits that there is no support in Mallory for the Examiner's statements that "too old" refers to frames that are "outside the window", and "not too old" refers to frames that are "inside the window". Furthermore, the Applicant points out that Mallory does not disclose or suggest any processing of out-of-order frames with regard to a "receive window", as disclosed by the Applicant.

Accordingly, the Applicant submits that claim 8 is allowable over the references cited in the Final Office Action.

VII. Rejection of Dependent Claims 9-10 under 35 U.S.C. § 102(b)

Claims 9 and 10 depend on independent claim 1. Therefore, the Applicant maintains that claims 9 and 10 are allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

With regard to claims 9 and 10, the Examiner states the following on pages 9-10 of the Examiner's Answer:

> Figure 4 that includes a receiver control logic (106), a reorder buffer (l20), and a receive status table (122) at least disclose storing information relating to a new hole created by placement of the out-of-order frame. The control logic controls the storing of out-of-order

> frame in the reorder buffer and storing of the state of the frames in the status table. The details of the status table are shown in figure 9. For example, Figure 9a includes information such as current sequence number and oldest sequence number. Figure 9c includes information such as miss time and receive time.

The Applicant respectfully disagrees. The Applicant points out that Figures 9 of Mallory do not show details of the status table 122 of Figure 4. For example, Figure 9a, which the Examiner cites above, shows detail of channel table 110 of Figure 4, and not status table 122. *See* Mallory at paragraph 0052. Additionally, Mallory, including Figures 4 and 9, does not disclose or suggest "storing information relating to a *new hole* ... updating information relating to an *existing hole* ..., and deleting information relating to a *plugged hole* ...," as recited by the Applicant in claims 9-10. Accordingly, the Applicant submits that claims 9-10 are allowable over the references cited in the Final Office Action.

VIII. Rejection of Dependent Claim 11 under 35 U.S.C. § 102(b)

Claim 11 depends on independent claim 1. Therefore, the Applicant maintains that claim 11 is allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

IX. Rejection of Dependent Claim 12 under 35 U.S.C. § 102(b)

Claim 12 depends on independent claim 1. Therefore, the Applicant maintains that claim 12 is allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

In addition, the Applicant submits that Mallory does not disclose or suggest at least the limitation of "updating the receive window based upon the placement of the data of the out-of-order frame," as claimed by the Applicant in

claim 12. In order to overcome this deficiency, the Final Office Action and the Examiner's Answer both refer to paragraph 0140 of Mallory. The Applicant would like to point out that even though Mallory discloses, at the above citations, that "the receiver will update its state by advancing the window of recent sequence numbers...," Mallory clearly does not disclose or suggest the limitation of "updating the receive window based upon the placement of the data of the out-of-order frame," as recited by the Applicant in claim 12. The term "window of recent sequence numbers" used by Mallory is clearly not the same as the term "receive window" as used by the Applicant in the present application. The Applicant points out that Mallory does not disclose or suggest any processing of out-of-order frames with regard to a "receive window", as disclosed by the Applicant. Accordingly, the Applicant maintains that claim 12 is allowable over the references cited in the Final Office Action.

X. Rejection of Dependent Claim 14 under 35 U.S.C. § 102(b)

Claim 14 depends on independent claim 1. Therefore, the Applicant maintains that claim 14 is allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1. Additionally, the Applicant maintains that Mallory does not disclose or suggest at least the limitation of "mapping TCP space into host buffer space," as claimed by the Applicant in claim 14.

With regard to claim 14, the Examiner states the following on page 10 of the Examiner's Answer:

> The examiner disagrees because the reorder buffer in Figure 4 is used for storing frames as described in paragraph 0060. The difference between storing and mapping is that mapping allocates an area in a buffer for storing a frame while storing a frame including allocate an area in the buffer for storing the frame and

> store the frame at the allocated area. Therefore, storing a frame at a buffer including mapping the frame into the buffer.

The Applicant respectfully disagrees that *storing of a frame necessarily includes mapping*. As Examiner has explained above, mapping allocates an area in a buffer for storing a frame, while storing a frame includes the act of saving the frame in an area of a memory. In other words, *memory mapping and storing are, functionally, completely separate.* If a frame is stored, it does not necessarily mean that a mapped memory was used for the storing. For example, information may be stored into memory based on physical memory address information. In such instances, memory addresses are not mapped and saving may be achieved without memory mapping. Therefore, the storing of Mallory does not necessarily include memory mapping. In addition, as explained in more detail above, Mallory does not disclose or suggest a host or a host buffer. Therefore, Mallory clearly does not disclose or suggest the limitation of "mapping TCP space into host buffer space," as recited by the Applicant in claim 14. Accordingly, the Applicant maintains that claim 14 is allowable over the references cited in the Final Office Action.

XI. Rejection of Dependent Claims 15-16 under 35 U.S.C. § 102(b)

Claims 15-16 depend on independent claim 1. Therefore, the Applicant maintains that claims 15-16 are allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

XII. Rejection of Dependent Claims 17-22 under 35 U.S.C. § 102(b)

Claims 17-22 depend on independent claim 1. Therefore, the Applicant maintains that claims 17-22 are allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

With regard to claims 17-22, the Examiner states the following on page 11 of the Examiner's Answer:

> The response to the argument of managing receive window hole information related to the out-of-order frame is described in previous paragraph. The parsing an out-of-order frame into control information and data information is disclosed in, for example, table 1 on page 4 and Figures 6-8. In table 1, the control bit (Ctl) is 1 when a frame is a standard Ethernet frame and is 0 when the frame is a control frame. The control bit is shown in Fig. 6-8.

The Applicant maintains that Mallory does not disclose or suggest, at the above citations, any of the limitations of "parsing an out-of-order frame into control information and data information ... processing at least one of the control information ... and managing receive window hole information related to the out-of-order frame," as recited by the Applicant in claims 17-22. For example, table 1 on page 4 of Mallory merely discloses the different LARQ header fields and does not disclose or suggest how an out-of-order frame is parsed and what type of data is obtained as a result of the frame parsing. Similarly, the Applicant submits that Figures 6-8 of Mallory also do not illustrate how an out-of-order frame is parsed. Furthermore, the Applicant again points out that Mallory does not disclose or suggest any processing with regard to "receive window hole information", as disclosed by the Applicant. Accordingly, the Applicant maintains that claims 17-22 are allowable over the references cited in the Final Office Action.

XIII. The Proposed Combination of Mallory and Hayes Does Not Render Claims 2-3 Unpatentable

Claim 2 recites, in part, "the out-of-order frame is received via a TCP offload engine (TOE) of the network subsystem or a TCP-enabled Ethernet controller (TEEC) of the network subsystem." The Applicant maintains that the proposed combination of Mallory and Hayes does not teach or suggest this limitation, as well as the limitations discussed above with respect to claim 1. Thus, at least for these reasons, the Applicant maintains that claims 2-3 are in condition for allowance.

XIV. The Proposed Combination of Mallory, Hayes and the APA Does Not Render Claims 23-29 Unpatentable

The Appellant stands by the argument made in the corresponding section of the Brief on Appeal.

The Appellant respectfully submits that claims 23-29 are allowable.

CONCLUSION

The Appellant submits that the pending claims are allowable in all respects. Reversal of the Examiner's rejections for all the pending claims and issuance of a patent on the Application are therefore requested from the Board.

The Commissioner is hereby authorized to charge additional fee(s) or credit overpayment(s) to the deposit account of McAndrews, Held & Malloy, Account No. 13-0017.

Respectfully submitted,

Date: 18-OCT-2006 By: _____

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